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REMARKS

We note that the Examiner concedes that the subject matter of claims 8, 19-20, 28, and 42-43 "would be allowable if rewritten in independent form ... and rewritten to overcome any objections stated" in the Office Action. Moreover, the Examiner concedes that the subject matter of claims 38-39 "would be allowable if rewritten to overcome the objections stated" in the Office Action. (Paper No. 20040416[1] at 11.)

The specification has been amended to replace each instance of "Q_{ref}" with "Q_{qc}" to correct an obvious typographical error. Support for these amendments is found in original claims 12, 17, 32, and 37.

Claim 1 has been amended to incorporate the subject matter of claim 8. Support for this amendment is found in the specification at, for example, page 6, lines 17-32; page 16, lines 1-24; page 30, lines 17-32; and page 35, lines 16-30; and in original claims 1 and 8. *See, In re Gardner*, 177 USPQ 396, 397 (CCPA 1973) and MPEP §§ 608.01(o) and (l) (8th ed. Rev. 2, May 2004, pp. 600-73 and 600-81 to 60-82).

Claims 4, 19-20, and 24 have been amended to include a period at the end of each claim. These amendments correct obvious typographic errors and do not change the scope of the claims in any way.

Claims 8 and 28 have been canceled without prejudice.

[1] We note that the "Paper No./Mail Date" of the Office Action is denoted as "**20040416**" on the bottom right of the Office Action Summary. However, the mailing date of the Office Action was **April 26, 2004**. The Examiner is respectfully requested to ensure that the mailing date of the Office Action is correctly noted in the USPTO computer system and in the file wrapper of the Application.

Claim 11 has been amended to recite "$Q_{est} = s_{2est}/s_{1est}$." Support for this amendment is found in the specification at, for example, page 16, lines 1-24 and in original claim 11. See *id.*

Claim 12 has been amended to depend from claim 11 and to recite "$Q_{qc} = s_{2qc}/s_{1qc}$." Support for these amendments is found in the specification at, for example, page 16, lines 1-24 and in original claims 11 and 12. See *id.*

Claim 16 has been amended to depend from claim 9 and to recite that "the spectrophotometer is an oximeter." Support for these amendments is found in the specification at, for example, page 13, line 20 - page 14, line 9; page 17, lines 5-34; and page 22, line 16 - page 24, line 23; in Figures 1-3; and in original claims 9, 13, and 16. See *id.*

Claim 17 has been amended to depend from claim 12 and to recite that "the spectrophotometer is an oximeter." Support for these amendments is found in the specification at, for example, page 13, line 20 - page 14, line 9; page 16, lines 1-24; page 17, lines 5-34; and page 22, line 16 - page 24, line 23; in Figures 1-3; and in original claims 11, 12, and 17. See *id.*

Claim 19 has also been amended to recite "N>1". This amendment corrects an obvious typographical error and does not change the scope of the claim in any way.

Claim 21 has been amended to incorporate the subject matter of claim 28. Support for this amendment is found in the specification at, for example, page 6, lines 17-32; page 9, line 29 - page 10, line 17; page 16, lines 1-24; page 30, lines 17-32; and page 35, lines 16-30; and in original claims 21 and 28. See *id.*

Claim 31 has been amended to recite "$Q_{est} = s_{2est}/s_{1est}$." Support for this amendment is found in the specification at, for example, page 16, lines 1-24 and in original claim 31. See *id.*

Claim 32 has been amended to depend from claim 31 and to recite "$Q_{qc} = s_{2qc}/s_{1qc}$." Support for these amendments is found in the specification at, for example, page 16, lines 1-24 and in original claims 31 and 32. See *id.*

Claim 36 has been amended to depend from claim 29 and to recite that "the spectrophotometer is an oximeter." Support for these amendments is found in the specification at, for example, page 13, line 20 - page 14, line 9; page 17, lines 5-34; and page 22, line 16 - page 24, line 23; in Figures 1-3; and in original claims 29, 33, and 36. See *id.*

Claim 37 has been amended to depend from claim 32 and to recite that "the spectrophotometer is an oximeter." Support for these amendments is found in the specification at, for example, page 13, line 20 - page 14, line 9; page 16, lines 1-24; page 17, lines 5-34; and page 22, line 16 - page 24, line 23; in Figures 1-3; and in original claims 31, 32, and 37. See *id.*

Claim 38 has been amended to replace "$A_{nod}(\lambda)$" with "$A_{mod}(\lambda)$" in four instances. These amendments correct obvious typographical errors and do not change the scope of the claim in any way.

Claim 40 has been amended to recite "wherein the processor, including memory, is adapted ...." This amendment has been made for purposes of clarity and does not change the scope of the claim in any way.

Claim 42 has been amended to recite:

> the temperature is measured and compared to a previous temperature measurement which was performed at a previous calculation of F_{neon} and wherein the spectral lamp is activated when the difference between the measured temperature and the previously measured temperature of the spectrophotometer deviates more than a critical temperature difference.

Support for this amendment is found in the specification at, for example, page 40, line 25 - page 41, line 2 and in original claim 42. See *id.*

Claim 43 has been amended to recite "the critical temperature difference is more than 0.3°C." Support for this amendment is found in the specification at, for example, page 40, line 25 - page 41, line 2 and in original claim 42. See *id.*

It is submitted that no new matter has been introduced by the foregoing amendments. Approval and entry of the amendments is respectfully solicited.

Objections

In the section of the Office Action entitled "Drawings and Specification" the Examiner objects to the specification "as failing to provide proper antecedent basis for the claimed subject matter." (Paper No. 20040416 at 2.)

The Examiner asserted that "claims 7 and 27 recite "'after normalization of the determined spectrum with an estimate of the concentration of the dye which lacks antecedent basis." (*Id.*) However, the specification expressly recites:

> In a preferred embodiment of the method according to the invention the wavelength shift $\Delta\lambda$ is determined ***after normalisation of the determined spectrum $A_m(\lambda)$ with an estimate of the concentration of the dye***.

Page 7, lines 30-33. Hence, the phrase to which the Examiner objects not only has antecedent basis in the specification; it has *ipsis verbis* support in the specification.

Accordingly, it is respectfully submitted that the objection has been made in error and should be withdrawn.

The Examiner asserted that "claims 12, 17, 32, and 37 recite the term Q_{qc}, which lacks antecedent basis." (Paper No. 20040416 at 2.) As noted above, each instance of the term "Q_{ref}" in the specification has been replaced with "Q_{qc}" to correct an obvious typographic error. Accordingly, the objection has been rendered moot and should be withdrawn.

The Examiner further asserted that "claim 40 recites another processor and memory which lacks antecedent basis." (*Id.*) It is respectfully submitted that claim 40 did not recite any additional processor or memory, but rather further defines the processor and memory recited in claim 21, from which claim 40 depends. However, merely for purposes of clarity, claim 40 has been amended to recite "wherein the processor, including a memory, is adapted ...." With this amendment, it is clear that the objection to claim 40 is in error and should be withdrawn.

The Examiner asserted that "claim 31 recites $Q_{est} = - s_2/s_1$ which lacks antecedent basis." (*Id.*) Claim 31 has been amended to remove the negative sign to correct an obvious typographical error. Accordingly, the phrase to which the Examiner objects has been deleted. The objection has therefore been rendered moot and should be withdrawn.

The Examiner objected to the drawings under 37 CFR 1.83(a). The Examiner asserted that the "the drawings must show every feature of the invention specified in the claims. Therefore, the spectral lamp, a neon lamp of claims 40-43 and

the separate memory and processor of claims 40-43 must be shown or the features canceled from the claim(s)." (*Id.*)

As to the spectral lamp, the Examiner's attention is drawn to feature 70 of Figure 3, which is defined as "a halogen lamp 70...." Page 23, line 8. Accordingly, contrary to the Examiner's the assertion, the "spectral lamp" is shown in the drawings.

As noted above claim 40 does not recite an additional processor and memory, but rather, claim 40 simply further defines the processor and memory recited in claim 21. Accordingly, contrary to the Examiner's assertion, no additional memory and/or processor need be shown in the drawings.

Accordingly, it is respectfully submitted that the objection to the drawings has been made in error and should be withdrawn.

In a section of the Office Action entitled "Claim Objections" the Examiner presents six objections, each is addressed in turn below. (*Id.* at 3.)

The Examiner objected to claims 4, 19, 20, and 24 because "they lack an ending period (.)." (*Id.*) Claims 4, 19, 20, and 24 have been amended to end with a period. Accordingly, the objection has been rendered moot and should be withdrawn.

The Examiner objected to claims 19 and 20 "for having more than one period by having ellipses." (*Id.*) Initially, we note that, after amendment, claims 19 and 20 contain only one period each. Accordingly, the Examiner assertion that the claims have "more than one period" appears to be in error.

Moreover, contrary to the Examiner's assertion, ellipses are not additional periods. Ellipses are specific grammatical marks that serve a purpose completely different from that of the period. An ellipsis is defined as:

> the omission of one or more words that are obviously understood but that must be supplied to make a construction grammatically complete ... marks or a mark (as ... or *** or –) indicating an omission (as of words) or a pause.

Merriam Webster's Collegiate Dictionary, Tenth Ed. (Springfield, MA 1997), pg. 375. (Attached as Exhibit 1.)

In contrast, a period serves to end a sentence and may only appear at the end of a claim so that the claim consists of a single sentence, as required. See MPEP § 608.01(m) (8th ed. Rev. 2, May 2004, p. 600-73) citing *Fressola v. Manbeck*, 36 USPQ2d 1211 (DDC 1995) ("Each claim begins with a capital letter and ends with a period. Periods may not be used elsewhere in the claims except for abbreviations.") However, this requirement is to ensure that the claims adhere to the "one-sentence rule." See *Fressola*, 36 USPQ2d at 1212-1213 (wherein the court affirmed the rejection of a claim containing multiple periods because the claim consisted of nine sentences.)

Accordingly, the requirement for a single period is intended to ensure that each claim contains only one sentence. The inclusion of ellipses in claims 19 and 20 does not violate the one-sentence rule, because ellipses are not periods, and therefore, even with the inclusion of ellipses each claim still consists of only one sentence. Accordingly, it is respectfully submitted that the objection is in error and should be withdrawn.

The Examiner further objected to claim 19 because it "does not define the term I in (N>I)." (Paper No. 20040416 at 3.) As noted above, the term "N>I" has been replaced with "N>1" to correct an obvious typographic error. Accordingly, the objection has been rendered moot and should be withdrawn.

The Examiner objected to claims 11-12 and 31-32 because "Q_{est} and Q_{qc} both equal s_2/s_1." (*Id.*) The Examiner required "differentiation between the two terms." (*Id.*) As suggested by the Examiner claims 11 and 31 have been amended to recite "$Q_{est} = s_{2est}/s_{1est}$" and claims 12 and 32 have been amended to recite "$Q_{qc} = s_{2qc}/s_{1qc}$". Accordingly, the objection has been rendered moot and should be withdrawn.

The Examiner objected to claims 38 and 39 because "all $A_{nod}(\lambda)$ terms should read --$A_{mod}(\lambda)$--." (*Id.*) As suggested by the Examiner, claim 38 has been amended to replace "$A_{nod}(\lambda)$" with "$A_{mod}(\lambda)$" to correct an obvious typographical error. We note that claim 39 does not contain the term to which the Examiner objects, but merely depends from claim 38. Accordingly, the objection has been rendered moot and should be withdrawn.

The Examiner objected to claim 42 because "'the spectrometer' of line 3 lacks antecedent basis." (*Id.*) Claim 42 has been amended and no longer contains the phrase to which the Examiner objects. Accordingly, the rejection has been rendered moot and should be withdrawn.

The Examiner objected to claim 43 because "'the previous F_{neon}' lacks antecedent basis." (*Id.*) Claim 43 has been amended and no longer contains the phrase to which the Examiner objects. Accordingly, the rejection has been rendered moot and should be withdrawn.

Indefiniteness Rejections

Claims 9-12, 16, 17, 29-32, 36, and 37 were rejected under 35 USC § 112, second paragraph. (Paper No. 20040416 at 3.)

In making the rejection as to claims 9 and 29, the Examiner asserted that "the terms s_1, s_2, $C_1(\lambda)$, $C_2(\lambda)$, a and b are indefinite terms, for they are not adequately defined in relation to the first and second components of the dyes." (*Id.*) In addition, the Examiner asserted that "the terms 'predetermined vectors' and 'parameters' are relative terms that make the values of the s, C, a, and b terms indefinite." (*Id.*)

In addition, the Examiner asserted that "claims 12 and 32 has the term Q_{est} which is indefinite for it is not adequately defined." (*Id.* at 4.)

As is well settled, all that is required to comply with 35 USC § 112, second paragraph, is that the metes and bounds of what is claimed be determinable with a reasonable degree of precision and particularity. *Ex parte Wu*, 10 USPQ2d 2031, 2033 (BPAI 1989). To reject a claim under the second paragraph of 35 USC § 112, it is incumbent on the examiner to establish that one of ordinary skill in the pertinent art, when reading the claims in light of the supporting specification, would not have been able to ascertain with a reasonable degree of precision and particularity the particular area set out and circumscribed by the claims. (*Id.*) This, the Examiner has not done. Moreover, relative terms are not *per se* indefinite. And merely characterizing a claim term as "a relative term" does not satisfy the Examiner's burden. For this reason alone, the rejection cannot stand and should be withdrawn.

Moreover, if the Examiner had undertaken the requisite factual inquiry he would have determined that the terms recited in claims 9 and 29 are well defined both within the claims and throughout the specification.

s_1 and s_2 find support within claims 9 and 29, where they are defined as:

$$s_1 = C_1(\lambda) \bullet A_m(\lambda)$$

$s_2 = C_2(\lambda) \cdot A_m(\lambda)$.

In the specification, s_1 and s_2 find support in numerous places.

On page 12, lines 25-27:

Each of the parameters s_1, s_1, and $\Delta\lambda$ may be determined by mathematical methods, such as multivariate analysis on data obtained from reference samples.

On page 13, line 26 - page 14, line 9:

calculating parameters s_1 and s_2 from

$$s_1 = C_1(\lambda) \cdot A_m(\lambda) \quad (14)$$

$$s_2 = C_2(\lambda) \cdot A_m(\lambda) \quad (15)$$

in which $C_1(\lambda)$ and $C_2(\lambda)$ are the predetermined vectors previously stored in the memory of the spectrophotometer, and calculating an estimated concentration c_{est} of the dye from

$$c_{est} = a\, s_1 + b\, s_2 \quad (16)$$

in which a and b are predetermined constants previously stored in the memory of the spectrophotometer, and s_1 and s_2 represents concentrations of a first and a second component, respectively, of the dye.

On page 29, lines 15-29:

From the coefficient vector, $C_1(\lambda)$ a score or parameter value, s_1 may be determined according to equation (14)

$s_1 = C_1(\lambda) \cdot A_m(\lambda)$

wherein $A_m(\lambda)$ is a measured spectrum of a QC/reference sample.

From the coefficient vector, $C_2(\lambda)$ a score or parameter value, s_2 may be determined according to equation (15)

$s_2 = C_2(\lambda) \cdot A_m(\lambda)$

> wherein $A_m(\lambda)$ is a measured spectrum of a QC/reference sample.

In a specific example employing Sulforhodamine, on page 30, line 34 - page 31, line 9:

> Then the absorption spectrum of the QC sample is determined. An estimated concentration of Sulforhodamine B in the QC sample may be determined by the measured absorption spectrum $A_m(\lambda)$ by equation (27) as
>
> $c_{est} = 0.1425\ s_1 + 0.0931\ s_2$
>
> since the values of s_1 and s_2 can be determined by the measured absorption spectrum $A_m(\lambda)$ and the vectors $C_1(\lambda)$ and $C_2(\lambda)$ according to equations (14) and (15). The ratio between s_1 and s_2 is determined and denoted Q_{est}.

Likewise, $C_1(\lambda)$ and $C_2(\lambda)$ find support in the claims themselves. "$C_1(\lambda)$ and $C_2(\lambda)$ are predetermined vectors previously stored in the memory of the spectrophotometer." In addition, $C_1(\lambda)$ and $C_2(\lambda)$ are defined throughout the specification.

On page 13, lines 10-18:

> Further, the mathematical parameter may comprise a vector $C_1(\lambda)$ fulfilling that
>
> $s_{i1} = C_1(\lambda) \bullet B_i(\lambda), \qquad i = 1, 2, \ldots, N \qquad (12)$
>
> and still further, the mathematical parameter may also comprise a vector $C_2(\lambda)$ fulfilling that
>
> $s_{i2} = C_2(\lambda) \bullet B_i(\lambda), \qquad i = 1, 2, \ldots, N \qquad (13)$

On page 14, lines 11-14:

> Likewise, in a preferred embodiment of the invention the memory of the spectrophotometer may further comprise vectors $C_1(\lambda)$ and $C_2(\lambda)$ fulfilling the equations (14) and (15).

On page 15, lines 25-35:

> According to a preferred embodiment of the invention, the spectrum of reference samples containing the dye in at least two different concentrations is determined, e.g. by an accurate reference instrument of the same type as the spectrophotometer to be quality controlled, at a selected set of wavelengths. Then the coefficient vectors $C_1(\lambda)$, $C_2(\lambda)$ and $C_{\Delta\lambda}(\lambda)$ and the constants a and b are determined, e.g. by multivariate analysis, and stored at the time of manufacture in the memory of the spectrophotometers to be quality controlled by fluid QC samples when put into their normal use.

On page 27, lines 11-16:

> $\Delta\lambda s_{i1}$, s_{i1}, s_{i2} are the scores or the constants corresponding to a concentration c_i.
>
> Coefficient vectors $C_1(\lambda)$, $C_2(\lambda)$ and $C_{\Delta\lambda}(\lambda)$ are, preferably, determined by multivariate analysis from the scores and the corresponding determined absorption spectra.

Similarly, a and b find support in claims 9 and 29. "a and b are predetermined constants previously stored in the memory of the spectrophotometer. a and b are disclosed in the specification in various places, including, on page 13, line 26 - page 14, line 9:

> calculating parameters s_1 and s_2 from
>
> $$s_1 = C_1(\lambda) \cdot A_m(\lambda) \qquad (14)$$
>
> $$s_2 = C_2(\lambda) \cdot A_m(\lambda) \qquad (15)$$
>
> in which $C_1(\lambda)$ and $C_2(\lambda)$ are the predetermined vectors previously stored in the memory of the spectrophotometer, and calculating an estimated concentration c_{est} of the dye from
>
> $$c_{est} = a\, s_1 + b\, s_2 \qquad (16)$$
>
> in which a and b are predetermined constants previously stored in the memory of the spectrophotometer, and s_1 and s_2 represents concentrations of a first and a second component, respectively, of the dye.

The determination of a and b for a specific example employing Sulforhodamine B is disclosed in the specification on page 28, lines 24 - page 29, line 10:

> Further, it is assumed that the following relation between the calculated scores and a total concentration, c_i of the dye exists
>
> $$c_i = a\, s_{i1} + b\, s_{i2} \qquad (27)$$
>
> wherein constants a and b may be found by several methods, preferably, by inserting the determined scores from the total concentrations, c_i of the dye of concentrations 2.5058 mmol/kg and 1.0023 mmol/kg in equation (27) and solve the resulting two equations with two unknown quantities, for a and b. The determined values of a, b are: a=0.1425; b=0.0931, so that equation (27) is determined as
>
> $$c_i = 0.1425\, s_{i1} + 0.0931\, s_{i2} \qquad (28)$$
>
> The validity of equation (28) may be checked by inserting scores s_{i1}, s_{i2} from reference solutions with total concentrations c_i of Sulforhodamine B not used in the determination of a and b. Thereby, the validity of equation (28) has been confirmed experimentally.

Q_{est} also finds support in the claims. Claims 12 and 32, as amended recite "$Q_{est} = s_{2est}/s_{1est}$." Moreover, Q_{est} is disclosed in the specification. including , for example, on page 16, lines 1-30:

> On manufacture of a QC sample the concentration C_{qc}, the ratio s_2/s_1 denoted Q_{qc} and an initial wavelength shift $\Delta\lambda_{qc}$ may be determined by a reference spectrophotometer. The initial wavelength shift of the QC sample emerges mainly from a variation in the composition of the solvent of the dye in the QC sample.
>
> A label, such as a bar-code label, a magnetic label, etc, may be attached to each of the QC samples containing one or more of the values c_{qc}, Q_{qc} and $\Delta\lambda_{qc}$ in question. Alternatively one or more of the values may be printed in a bar code on a paper sheet following a set of QC samples.

> The values appearing on the labels or paper sheet are designated assigned values.
>
> During quality control of a specific spectrophotometer, the assigned values of c_{qc}, Q_{qc} and $\Delta\lambda_{qc}$ are read by the spectrophotometer and the values are stored in its memory. Then the spectrum of the QC sample is determined and s_1, s_2, and $\Delta\lambda$ are determined as previously described. The determined values for $Q_{est} = s_2/s_1$, $\Delta\lambda$ and c_{est} are also calculated and compared to the assigned values of Q_{qc}, $\Delta\lambda_{qc}$ and c_{qc}, respectively.
>
> A possible dilution of the QC sample may be determined from a difference between Q_{est} and Q_{qc}, and the combined effect of dilution and deviations in length d of the light path through the cuvette may be determined from a difference between c_{est} and c_{qc}.

In a specific example employing Sulforhodamine B, on page 30, line 34 - page 31, line 9:

> Then the absorption spectrum of the QC sample is determined. An estimated concentration of Sulforhodamine B in the QC sample may be determined by the measured absorption spectrum $A_\mu(\lambda)$ by equation (27) as
>
> $$c_{est} = 0.1425\ s_1 + 0.0931\ s_2 \qquad (28)$$
>
> since the values of s_1 and s_2 can be determined by the measured absorption spectrum $A_m(\lambda)$ and the vectors $C_1(\lambda)$ and $C_2(\lambda)$ according to equations (14) and (15). The ratio between s_1 and s_2 is determined and denoted Q_{est}.

As demonstrated above, there is nothing vague or indefinite about any of the terms recited in claims 9, 12, 29, and 32. And, the Examiner has not provided any evidence to establish that one of ordinary skill in the pertinent art, when reading the claims in light of the supporting specification, would not have been able to ascertain with a reasonable degree of precision and particularity the particular area set out and circumscribed by the claims. That, however, was his burden. Simply put, one skilled

in the art would have readily recognized what was claimed. Nothing more is required. Accordingly, the rejection is both legally and factually deficient as to claims 9, 12, 29, and 32 and should be withdrawn.

Claims 10-12 and 30-32 were also rejected merely "for depending from claims 9 and 29 respectively." (Paper No. 20040416 at 3-4.) As demonstrated above, the rejection of claims 9 and 29 is both legally and factually deficient. Accordingly, the rejection of claims 10-12, which depend from claim 9, and claims 30-32, which depend from claim 29, are also legally and factually deficient and should be withdrawn.

In making the rejection as to claims 16, 17, 36, and 37, the Examiner asserted that "the terms : C_{est}, C_{qc}, Q_{est} and Q_{qc} lack antecedent basis and are not adequately defined." (*Id.* at 4.) In addition, the Examiner asserted that "the terms are unspecified variables, and therefore, render their values indefinite." (*Id.*)

As is well settled, all that is required to comply with 35 USC § 112, second paragraph, is that the metes and bounds of what is claimed be determinable with a reasonable degree of precision and particularity. *Wu*, 10 USPQ2d at 2033. To reject a claim under the second paragraph of 35 USC 112, it is incumbent on the examiner to establish that one of ordinary skill in the pertinent art, when reading the claims in light of the supporting specification, would not have been able to ascertain with a reasonable degree of precision and particularity the particular area set out and circumscribed by the claims. (*Id.*) Once again, the Examiner has not met his burden.

Initially we note that although unnecessary, and only to further prosecution, the dependency of claims 12, 16, and 17 has been amended for clarity and that all of the objected to terms have proper antecedent basis. In addition, the

term Q_{ref} has been replaced in all instances in the specification with Q_{qc} to correct an obvious typographical error. Accordingly, to the extent that the rejection is predicated on the lack of antecedent basis for Q_{qc} in the specification the rejection has been rendered moot.

We further note that the Examiner has not made any factual determination that establishes that one of ordinary skill in the art would not have been able to ascertain with a reasonable degree of precision and particularity the particular area set out and circumscribed by the claims. For this reason alone, the rejection cannot stand and should be withdrawn.

Moreover, if the Examiner had undertaken the requisite factual inquiry he would have determined that the terms recited in claims 16-17 and 36-37 are well defined both within the claims and throughout the specification.

C_{qc} and C_{est} are recited in claim 9 from which claim 16 depends, and in claim 29 from which claim 36 depends. C_{qc} is a "known dye concentration" and "$C_{est} = a\ s_1 + b\ s_2$." Similarly Q_{est} and Q_{qc} are recited in claims 11 and 12, from which claim 17 depends, and in claims 31 and 32 from which claim 37 depends. "$Q_{est} = s_{2est}/s_{1est}$" and "$Q_{qc} = s_{2qc}/s_{1qc}$."

Moreover, C_{est}, C_{qc}, Q_{est}, and Q_{qc} are disclosed in the specification in various places, for example, at page 16, lines 1-30:

> On manufacture of a QC sample the concentration c_{qc}, the ratio s_2/s_1 denoted Q_{qc} and an initial wavelength shift $\Delta\lambda_{qc}$ may be determined by a reference spectrophotometer. The initial wavelength shift of the QC sample emerges mainly from a variation in the composition of the solvent of the dye in the QC sample.

A label, such as a bar-code label, a magnetic label, etc, may be attached to each of the QC samples containing one or more of the values c_{qc}, Q_{qc} and $\Delta\lambda_{qc}$ in question. Alternatively one or more of the values may be printed in a bar code on a paper sheet following a set of QC samples. The values appearing on the labels or paper sheet are designated assigned values.

During quality control of a specific spectrophotometer, the assigned values of c_{qc}, Q_{qc} and $\Delta\lambda_{qc}$ are read by the spectrophotometer and the values are stored in its memory. Then the spectrum of the QC sample is determined and s_1, s_2, and $\Delta\lambda$ are determined as previously described. The determined values for $Q_{est} = s_2/s_1$, $\Delta\lambda$ and c_{est} are also calculated and compared to the assigned values of Q_{qc}, $\Delta\lambda_{qc}$ and c_{qc}, respectively.

A possible dilution of the QC sample may be determined from a difference between Q_{est} and Q_{qc}, and the combined effect of dilution and deviations in length d of the light path through the cuvette may be determined from a difference between c_{est} and c_{qc}.

On page 30, lines 17-32:

QC samples are, preferably, manufactured in lots, which may comprise 40,000-50,000 samples. The lot values of c_{qc}, Q_{qc} and $\Delta\lambda_{qc}$ are, preferably, determined during manufacturing by measuring 5-10 samples on 3 reference oximeters. The oximeters have been adjusted to report exact parameter values on a standard blood sample.

Average values of each of the measured parameters c_{qc}, Q_{qc} and $\Delta\lambda_{qc}$ are calculated and preferably stored on a bar-code label attached to each of the QC samples.

During a quality control procedure of an oximeter in normal operation, e.g. at a hospital, the values of c_{qc}, Q_{qc} and $\Delta\lambda_{qc}$ are read from the bar-code label of the QC sample by a bar-code reader and stored in the memory of the oximeter.

As demonstrated above, there is nothing vague or indefinite about any of the terms recited in claims 16-17 and 36-37. And, the Examiner has not provided any

evidence to establish that one of ordinary skill in the pertinent art, when reading the claims in light of the supporting specification, would not have been able to ascertain with a reasonable degree of precision and particularity the particular area set out and circumscribed by the claims. That, however, was his burden. Simply put, one skilled in the art would readily recognize what is being claimed. Nothing more is required. Accordingly, the rejection of claims 16-17 and 36-37 is both legally and factually deficient and should be withdrawn.

Rejections under 35 USC § 103

Claims 1-4, 7, 13-16, 21-24, 27, and 33-36 were rejected under 35 USC § 103(a) as being unpatentable over Scharlack, U.S. Patent No. 5,828,445 ("Scharlack") in view of Stark et al., U.S. Patent No. 5,568,400 ("Stark") and Sodickson et al., U.S. Patent No. 5,724,268 ("Sodickson"). (Paper No. 20040416 at 4.)

For the reasons set forth below the rejection, respectfully is traversed.

Scharlack discloses "methods of determining and reporting the performance of VIS-IR spectrophotometers used to measure the concentration of hemoglobin components or fractions in blood samples. In particular, the method is used to determine the performance of CO-oximeters." Col. 1, lines 51-56.

Stark discloses a method and apparatus for "to improve the accuracy of multivariate analysis of spectral data structures derived from measurements using spectroscopy ...." Col. 5, lines 26-29. More specifically, Stark discloses a method and apparatus "to more accurately correct spectral data to reduce or eliminate multiplicative effects thereby improving and simplifying subsequent additive modeling

... [by] distinguish[ing] additive features, which in spectroscopy may be chemical or physical, from multiplicative features, which in spectroscopy are generally physical, thereby reducing the danger of confusing and destroying the desired information in the multiplicative signal correction process." Col. 5, lines 34-44.

Sodickson discloses apparatus and methods "for the accurate determination of sample concentration ... [by] correct[ing] for experimental errors (including instrument induced errors) that would otherwise introduce errors into the measured sample component concentrations." Col. 1, lines 44-49. The correction of error is accomplished by:

> modeling the total experimental error as the sum of one or more types of errors that can be written as $\xi \cdot K$. The spectrum is then modeled as $Y = P \cdot C + \xi \cdot K$. Using the observed spectrum, known values for P, and a mathematical model for ξ, this equation can be solved for the best fit value of the sample component concentration.

Abstract.

In making the rejection as to claims 1 and 21, the Examiner asserted that "Scharlack discloses a method for measuring and reporting co-oximeter quality control results of a spectrophotometer, particularly co-oximeter, comprising determining an absorption spectrum of a fluid quality control sample with a significant absorbance peak with a steep flank and a reference absorption spectrum of a reference quality control sample stored (col. 2, lines 5-20; col. 3, lines 45-67; col. 4, lines 34-55; col. 5, lines 1-25; Figs. 1 and 4)." (Paper No. 20040416 at 4.) The Examiner further asserted that Scharlack discloses that "the wavelength shift [] may be predetermined by the error spectrum (col. 6, lines 1-15) ... And the error spectrum is derived from a reference and measured absorbance at each wavelength (col. 5, lines 15-25)." (*Id.*)

The Examiner asserted that Sodickson discloses "errors such as from wavelength shift are the difference of an observed spectrum form an ideal spectrum and that spectra are vectors comprising intensities at wavelength ranges (col. 2, lines 40-65; col. 4, lines 40-65; col. 5, lines 35-60)." (*Id.* at 4-5.) The Examiner asserted that Stark discloses "multiplicative correction methods for spectra data; whereas, the corrections depend on normalizing, coefficient estimation (Figs. 3 and 4) and that an error from a spectra to be removed is the difference from an ideal spectra and the observed spectra (col. 6, lines 1-35; col. 7, lines 60-65; col. 8, lines 1-65; col. 9, lines 1-25)." (*Id.* at 5.)

The Examiner then concluded that "it would be obvious that the wavelength shift is determined for the error spectrum comprises the difference between the measured and estimated spectra, an ideal spectra, at each wavelength." (*Id.*)

As to claim 2 and 22, the Examiner relied on his earlier characterization of the cited documents and merely added that "Scharlack discloses the error spectrum is determined from an absorption spectrum and a predetermined mathematical parameter (col. 4, lines 35-65; col. 5, lines 1-25)." (*Id.*)

As to claims 3-4 and 23-24, the Examiner relied on his earlier characterization of the cited documents and added "Scharlack discloses the mathematical parameter is a coefficient vector (col. 5, lines 25-60). As for the vector fulfilling the equation whereas the wavelength shift equals the vector times the absorbance spectrum, Scharlack discloses the equations 6a and 6b and 3 (col. 5, lines

11, 47, and 52)." (*Id.* at 5-6.) The Examiner then concluded that "[i]t would be obvious ... that wavelength shift equals the vector times the absorbance spectrum...." (*Id.* at 6.)

As to claim 7 and 27, the Examiner relied on his earlier characterization of the cited documents and acknowledged that "Scharlack is silent concerning normalization." (*Id.*) To fill this acknowledged gap, the Examiner asserted that Scharlack "discloses that values are made nominal are set to those values observed in normal human blood (col. 3, lines 1-5) and well-known mathematical techniques of fitting spectra can be used (col. 5, lines 1-10)." (*Id.*) In a further attempt to fill the acknowledged gap, the Examiner asserted that "Stark discloses normalizing data for correcting spectra (Fig. 3)." (*Id.*) The Examiner concluded that [i]t will be obvious ... that the wavelength shifts is determined after normalization of the determined spectrum with an estimate of the dye ...." (*Id.*)

As to claims 13 and 33, the Examiner relied on his earlier characterization of the cited documents and merely added that "Scharlack discloses a co-oximeter (col. 3, lines 45-50)." (*Id.*)

As to claims 14 and 34, the Examiner relied on his earlier characterization of the cited documents and merely added that "Scharlack discloses the wavelength ranges at least 500 to 640 nm (see Figs. 1-4)."[2] (*Id.*)

[2] We note that this paragraph has apparently been repeated and is found both on the bottom of page 6 and on the top of page 7 of the Office Action. It is assumed that this merely a typographical error and that claims 14 and 34 have not been rejected on two separate grounds. If this assumption is incorrect the Examiner is respectfully requested to reissue the rejection to clearly state the grounds for rejection of claims 14 and 34.

As to claims 15 and 35, the Examiner relied on his earlier characterization of the cited documents and merely added that "Scharlack discloses determining estimated errors in blood parameters (col. 6, lines 1-65)." (*Id.* at 7.)

As to claims 16 and 36, the Examiner relied on his earlier characterization of the cited documents and merely added that "Scharlack discloses determining estimated errors in blood parameter values reported by the spectrophotometer caused by a difference between c_{est} and c_{qc} (col. 4, lines 35-65; col. 5,1-25; col. 6, lines 1-15)." (*Id.*)

In an effort to further prosecution, clams 1 and 21 have been amended to incorporate the subject matter of claims 8 and 28, respectively. The Examiner has expressly stated that the subject matter of claims 8 and 28 "would be allowable if rewritten in independent form ... and rewritten to overcome any objections stated" in the Office Action because "the prior art of record, taken alone or in combination, fails to disclose or render obvious" the subject matter of claim 8 or claim 28. (*Id.* at 11.)

Accordingly, claims 1 and 21, as amended, are allowable and it is respectfully submitted that the rejection should be withdrawn as to these claims. Moreover, claims 2-4, 7, and 13-16 all depend from claim 1 and claims 22-24, 27, and 33-36 all depend from claim 21. Because claims 1 and 21, as amended, are allowable, claims 2-4, 7, 13-16, 22-24, 27, and 33-36 are also allowable, and the rejection as to these claims should also be withdrawn. See MPEP § 2143.03, 8th ed., Rev. 2, May 2004, p. 2100-133 ("[i]f an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious.") citing *In re Fine*, 5 USPQ2d 1596, 1599 (Fed. Cir. 1988).

Claims 5-6, 18, and 25-26 were rejected under 35 USC § 103(a) as being unpatentable over Scharlack in view of Stark and Sodickson in further view of Maggard, WO 94/08225 ("Maggard"). (Paper No. 20040416 at 7.)

For the reasons set forth below the rejection, respectfully is traversed.

Scharlack, Stark, and Sodickson are summarized above.

Maggard discloses "a method for calibrating or recalibrating a first spectrometer in light of a second spectrometer, or itself, respectively." Page 6, lines 24-26.

In making the rejection as to claims 5-6 and 25-26, the Examiner asserted that "Scharlack in view of Stark and Sodickson discloses everything as above (see claims 4 and 24 above)." (Paper No. 20040416 at 7.) The Examiner further asserted that "Scharlack discloses the reference spectrum is determined on a calibrated spectrophotometer (col. 4, lines 34-50) and that known mathematical techniques of fitting are used (col. 5, lines 1-10)." (*Id.*)

The Examiner then asserted that:

> Maggard in a spectroscopic instrument calibration discloses that Taylor series and linear combinations of derivatives are used in the calibration of spectra (pages 14-17). And Stark [discloses] using Taylor expansions in correcting data (col. 6, lines 25-28). Sodickson also [discloses] using the first derivative of the spectrum for deriving the error-induced deviation (col. 5, lines 30-60; col. 12, lines 60-67).

(*Id.*) The Examiner concluded that "[i]t would be obvious ... that Taylor series and first derivatives from the reference."[3] (*Id.*)

[3] We note that this statement of obviousness appears to be incomplete. Accordingly, the Examiner is respectfully requested to reissue the rejection to clearly state the grounds for the rejection.

In making the rejection as to claim 18, the Examiner asserted "Scharlack in view of Stark and Sodickson discloses everything as above (see claim 1 above)." (*Id.* at 8.) In addition, the Examiner asserted that Scharlack "discloses that a first concentration and a second concentration levels are used in deriving parameters (Figs. 2 and 4) ... that vectors and matrices, linear combinations of vectors, are derived (col. 5, lines 5-65) ... the reference spectrum is determined on a calibrated spectrophotometer (col. 4, lines 34-50) and that known mathematical techniques of fitting are used (col. 5, lines 1-10)." (*Id.*) The Examiner also asserted that Maggard discloses "that in a calibrating of spectra, linear combinations of derivatives are used (pages 14-17)." (*Id.*) The Examiner further asserted that Sodickson discloses "using the first derivative of the spectrum for deriving the error-induced deviation (col. 5, lines 30-60; col. 12, lines 60-67)." (*Id.*) The Examiner then concluded that "[i]t would be obvious ... that the wavelength shift is derived from the first derivative...." (*Id.*)

As discussed above, claims 1 and 21, as amended, are allowable. Thus, claims 5-6 and 18, which depend from claim 1, and claims 25-26, which depend from claim 21, are also allowable. See MPEP § 2143.03, *supra*. Accordingly, it is respectfully submitted that the rejection should be withdrawn.

Claims 9-10 and 29-30 were rejected under 35 USC § 103(a) as being unpatentable over Scharlack "in evidence of" Stark, Sodickson, and Maggard in view of Campbell et al., EPO 0 132 399 ("Campbell"). (Paper No. 20040416 at 8.)

For the reasons set forth below the rejection, respectfully is traversed.

Scharlack, Stark, Sodickson, and Maggard are summarized above.

Campbell discloses "cooximetry quality control reagents; more particularly ... cooximetry quality control reagents which are free from blood-derived components." Page 1, lines 3-6. Campbell discloses a "cooximetry quality control composition which is free from blood-derived components and which comprises a solution of one or more dyes, which solution mimics the spectral response of whole blood at a plurality of wavelengths in the visible region." Page 6, lines 6-11.

In making the rejection, the Examiner asserted that "Scharlack in view of Stark and Sodickson discloses everything as above (see claims 1 and 21 above)." (Paper No. 20040416 at 8.) The Examiner asserted that Scharlack "discloses 'n' components (col. 4, lines 25-30). And that the QC sample should mimic the samples being frequently analyzed such as blood (col. 4, lines 55-65)." (*Id.*) The Examiner then asserted that "Campbell in cooximetry quality control reagents teaches that the quality control may contain more than one dye that mimics the spectral response of blood at a plurality of wavelengths (page 6, lines 5-10)." (*Id.*) The Examiner concluded that "[i]t would be obvious to have a quality control sample comprise more than one dye component in order to mimic blood over a plurality of wavelengths...." (*Id.*)

The Examiner then asserted "[a]s for the particular parameters, Scharlack discloses similar parameters using different variables (col. 4; equations 1 and 2; col. 5; equations 3, 4, and 5). And the estimated concentration of the dye as a linear combination may be seen in the use of vectors and matrices in the estimation of absorbance spectrum and the errors in the measured concentration of blood components (col. 5, lines 5-55) and the apparent concentrations are derived (col. 6,

lines 1-55)." (*Id.* at 9.) "As for c_{est} and c_{qc}, Scharlack [discloses] that they will be compared by the error spectrum and the relation of concentration to the absorbance spectrum (equations 4 and 5)." (*Id.*)

The Examiner also asserted that Sodickson discloses "that errors such as from wavelength shift are the difference of an observed spectrum from an ideal spectrum and that spectra are vectors comprising intensities at wavelength ranges (col. 2, lines 40-65; col. 4, lines 40-65; col. 5, lines 35-60)." (*Id.*) The Examiner further asserted that "Maggard ... discloses that Taylor series and linear combinations of derivatives are used in the calibration of spectra (pages 14-17). And that Stark [discloses] using Taylor expansions in correcting data (col. 6, lines 25-28)." (*Id.*)

As discussed above, claims 1 and 21, as amended, are allowable. Thus, claims 9 and 10, which depend from claim 1, and claims 29 and 30, which depend from claim 21, are also allowable. See MPEP § 2143.03, *supra*. Accordingly, it is respectfully submitted that the rejection should be withdrawn.

Claim 40 was rejected under 35 USC § 103(a) as being unpatentable over Scharlack in view of Stark and Sodickson further in view of Kowalski et al., U.S. Patent No. 5,459,677 ("Kowalski") and Allen et al., U.S. Provisional Application No. 60/088816 ("Allen"). (Paper No. 20040416 at 9).

For the reasons set forth below the rejection, respectfully is traversed.

Scharlack, Stark, and Sodickson are summarized above.

Kowalski discloses "a technique for transferring a multivariate calibration model from a reference instrument to a target instrument ... [which] may be a different instrument, or the same instrument at a later time." Col. 3, lines 62-66

Allen discloses a "Raman spectrometer apparatus capable of simultaneously acquiring a spectrum and data required for compensating for variabilities in the substantially monochromatic radiation employed as an excitation source, as well as compensation for instrumentation issues, leading to a system that generates Raman spectra that are instrument independent." Page 3, lines 29-33.

In making the rejection the Examiner asserted that "Scharlack in view of Stark and Sodickson discloses everything as above (see claim 21 above)." (Paper No. 20040416 at 9.) The Examiner further asserted that Scharlack discloses "that the spectrometer detects at least in the range 500-640 (Figs. 1-4). And discloses compensating for errors derived (col. 6, lines 1-15). The derived spectrum in memory was taken from a calibrated spectrophotometer (col. 4, lines 35-65)." (*Id.*)

The Examiner acknowledged, however, that Scharlack "is silent concerning a spectral lamp for calibrating wavelengths." (*Id.*)

To fill the acknowledged gap, the Examiner asserted that Kowalski discloses "compensating a target instrument's response by applying a reference instruments responses (Figs. 2a, 2b, 5a, 5b)." (*Id.* at 10.) In a further attempt to fill the acknowledged gap, the Examiner asserted that Allen discloses "using a neon source to calculate instrument response such as shift and compensate the spectra through calibration with excitation source's spectral response (pages 10-11; Fig. 2)." (*Id.*)

The Examiner then concluded that "[i]t would be obvious ... to have a spectral lamp such as neon source and use its spectral response in order to calibrate a

sample's spectrum through compensating for wavelength shift due to the system's response...." (*Id.*)

As discussed above, claim 21, as amended, is allowable. Thus, claim 40, which depends from claim 21, is also allowable. See MPEP § 2143.03, *supra*. Accordingly, it is respectfully submitted that the rejection should be withdrawn.

Claim 41 was rejected under 35 USC § 103(a) as being unpatentable over Scharlack in view of Stark and Sodickson further in view of Kowalski and Allen further in view of Werner, U.S. Patent No. 6,103,197 ("Werner"). (Paper No. 20040416 at 10.)

For the reasons set forth below the rejection, respectfully is traversed.

Scharlack, Stark, Sodickson, Kowalski, and Allen are summarized above.

Werner discloses "a method and apparatus for optically determining the total hemoglobin concentration in non-hemolyzed whole blood, which will yield useful measured results while offering simplicity of design and computing operations." Col. 2, lines 59-63. This method and apparatus are realized:

> by employing a first measurement wavelength of λ_1 <805 nm and a second measurement wavelength of λ_2>805 nm such that the following is valid for the absorption coefficients of the hemoglobin derivatives O_2Hb and RHb at the two measurement wavelengths λ_1 and λ_2 : $\sigma O(\lambda_1)$ equals approximately $\sigma R(\lambda_2)$ and $\sigma R(\lambda_1)$ equals approximately $\sigma O(\lambda_2)$, and that the absorption values A_1 and A_2 are measured at the wavelengths λ_1 and λ_2 and the sum of the two absorption values A_1+A_2 is a quantity which is proportional to the total hemoglobin concentration tHb and independent of the oxygen saturation O_{2sat}. The method of the invention employs two isosbestically symmetric wavelengths, which are selected such that a measurement using conventional laser diodes will produce the same

> advantages as would be offered by performing a measurement directly at the isosbestic point. The absorption coefficients of O_2Hb and RHb should not differ from each other by more than ±5% at the two wavelengths λ_1 and λ_2. Moreover, the measurement is largely independent of the oxygen saturation of the sample.

Col. 3, lines 1-20.

In making the rejection the Examiner asserted that "Scharlack in view of Stark, Sodickson, Kowalski, and Allen disclose everything as above (see claim 40)." (Paper No. 20040416 at 10.) The Examiner acknowledged, however, that Scharlack "is silent concerning two photodiodes for ratioing signals." (*Id.*)

To fill the acknowledged gap, the Examiner asserted that Werner discloses "an apparatus having at least two photodiodes for ratioing signals for calibration purposes (col. 6, lines 10-30)." (*Id.*) The Examiner then concluded that "[i]t would be obvious ... to have a the system comprise two photodiodes that have their signals ratioed in order to calibrate the system." (*Id.*)

As discussed above, claim 21, as amended, is allowable. Thus, claim 41, which depends from claim 21, is also allowable. See MPEP § 2143.03, *supra*. Accordingly, it is respectfully submitted that the rejection should be withdrawn.

Accordingly, for the reasons set forth above, entry of the amendments, withdrawal of the rejections and objections, and allowance of the claims are respectfully requested. If the Examiner has any questions regarding this paper, please contact the undersigned.

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on July 26, 2004.

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Respectfully submitted,

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Asian

long inflatable proboscis: a
astal waters from southeast-
M. leonina) found in coastal
ia
: of or relating to ancient
ated there in worship of De-

: ELEVATED
E, fr. L *elevatus*, pp. of *ele-*
:VER] *vt* (15c) **1** : to lift up
ALT **3** : to improve morally,
: spirits of : ELATE ~ *vi* : to
shout⟩ *syn* see LIFT
aised esp. above the ground
eased esp. abnormally (as in
a : being morally or intel-
b : FORMAL, DIGNIFIED ⟨~
g

e height to which something
of something (as a celestial
e to which a gun is aimed
e level of the sea : ALTITUDE
d seeming suspension in the
on **3** : an act or instance of
as **a** : an elevated place **b**
ity or state of being elevated
ng) on a vertical plane *syn*

that raises or lifts something
veyor with cleats, scoops, or
or platform and its hoisting
to different levels **c** : GRAIN
isu. attached to the tail plane
AIRPLANE illustration
rangements of popular songs
ore⟩
en, adj., fr. OE *endleofan*, fr.
OE *lēon* to lend — more at
able **2** : the 11th in a set or
embers; *esp* : a football team
— **elev·enth** \-vən(t)th\ *adj*

t : an examination taken by
d 12 that determines the type
assigned
: *sing in constr* [double pl. of
eshment (as a snack) taken in

ole time ⟨still making changes

] (1944) : an airplane control
ator and aileron
lf; akin to ON *alfr* elf & perh.
c) **1** : a small often mischie-
so : a usu. lively mischievous
lf — **elf·ish·ly** *adv*
1 a : of, relating to, or pro-
. in its tiny size ⟨~ portions⟩
ality or charm
as if by elves — usu. used in

ous owl (*Micrathene whitneyi*)
nat often roosts and nests in

+ *high* (school)] (ca. 1948)
des 1 to 12
st of Israel who according to
h the care of the boy Samuel
Eliyāh] : ELIJAH
ere, fr. *e-* + *lacere* to allure]
something latent or potential)
to call forth or draw out (as
nce ~*ed* wild applause⟩ *syn*
ən, *ē-*\ *n* — **elic·i·tor** \ī-'li-

ere to strike out, fr. *e-* + *lae-*
1 : to suppress or alter (as a
: out (as a written word) **2** a
CURTAIL, ABRIDGE
& LL; MF, fr. LL *eligibilis*, fr.
(15c) **1 a** : qualified to be
mitted under football rules to

catch a forward pass ⟨an ~ receiver⟩ **2** : worthy of being chosen : DESIRABLE ⟨an ~ young bachelor⟩ — **el·i·gi·bil·i·ty** \ˌe-lə-jə-'bi-lə-tē\ *n* — **eligible** *n* — **el·i·gi·bly** \'e-lə-jə-blē\ *adv*

Eli·jah \ī-'lī-jə\ *n* [Heb *Ēliyāh*] : a Hebrew prophet of the 9th century B.C. who according to the account in I Kings championed the worship of Jehovah as against Baal

elim·i·nate \i-'li-mə-ˌnāt\ *vt* **-nat·ed; -nat·ing** [L *eliminatus*, pp. of *eliminare*, fr. *e-* + *limin-*, *limen* threshold] (1568) **1 a** : to cast out or get rid of : REMOVE, ERADICATE ⟨the need to ~ poverty⟩ **b** : to set aside as unimportant : IGNORE **2** : to expel (as waste) from the living body **3** : to cause (as an unknown) to disappear by combining two or more mathematical equations — **elim·i·na·tive** \-'li-mə-ˌnā-tiv\ *adj* — **elim·i·na·tor** \-ˌnā-tər\ *n*

elim·i·na·tion \i-ˌli-mə-'nā-shən\ *n, often attrib* (1627) : the act, process, or an instance of eliminating or discharging: as **a** : the act of discharging or excreting waste products from the body **b** : the removal from a molecule of the constituents of a simpler molecule ⟨ethylene is formed by the ~ of water from ethanol⟩ — compare ADDITION 4

ELISA \ē-'lī-sə, -zə\ *n* (1978) : ENZYME-LINKED IMMUNOSORBENT ASSAY

Eli·sha \i-'lī-shə\ *n* [Heb *Ēlīshā'*] : a Hebrew prophet and disciple and successor of Elijah

eli·sion \i-'li-zhən\ *n* [LL *elision-*, *elisio*, fr. L *elidere*] (1581) **1 a** : the use of a speech form that lacks a final or initial sound which a variant speech form has (as 's instead of *is* in *there's*) **b** : the omission of an unstressed vowel or syllable in a verse to achieve a uniform metrical pattern **2** : the act or an instance of omitting something : OMISSION

elite \ā-'lēt, i-, ē-\ *n* [F *élite*, fr. OF *eslite*, fr. fem. of *eslit*, pp. of *eslire* to choose, fr. L *eligere*] (1823) **1** *a sing or pl in constr* : the choice part : CREAM ⟨the ~ of the entertainment world⟩ **b** *sing or pl in constr* : the best of a class ⟨superachievers who dominate the computer ~ —Marilyn Chase⟩ **c** *sing or pl in constr* : the socially superior part of society ⟨how the ~ live —*A P World*⟩ ⟨how the French-speaking ~ . . . was changing —*Economist*⟩ **d** : a group of persons who by virtue of position or education exercise much power or influence ⟨members of the ruling ~⟩ ⟨the intellectual ~s of the country⟩ **e** : a member of such an elite — usu. used in pl. ⟨the ~s . . . pursuing their studies in Europe —Robert Wernick⟩ **2** : a typewriter type providing 12 characters to the linear inch — **elite** *adj*

élite, élitism *chiefly Brit var of* ELITE, ELITISM

elit·ism \ā-'lē-ˌti-zəm, i-, ē-\ *n* (1947) **1** : leadership or rule by an elite **2** : the selectivity of the elite; *esp* : SNOBBERY 1 ⟨~ in choosing new members⟩ **3** : consciousness of being or belonging to an elite — **elitist** \-'lē-tist\ *n or adj*

elix·ir \i-'lik-sər\ *n* [ME, fr. ML, fr. Ar *al-iksīr* the elixir, fr. *al* the + *iksīr* elixir, prob. fr. Gk *xērion* desiccative powder, fr. *xēros* dry] (14c) **1 a** (1) : a substance held capable of changing base metals into gold (2) : a substance held capable of prolonging life indefinitely **b** (1) : CURE-ALL (2) : a medicinal concoction **2** : a sweetened liquid usu. containing alcohol that is used in medication either for its medicinal ingredients or as a flavoring **3** : the essential principle

Eliz·a·be·than \i-ˌli-zə-'bē-thən\ *adj* (1807) : of, relating to, or characteristic of Elizabeth I of England or her reign — **Elizabethan** *n*

elk \'elk\ *n, pl* **elks** [ME, prob. fr. OE *eolh*; akin to OHG *elaho* elk, Gk *elaphos* deer] (bef. 12c) **1** *pl usu* **elk** **a** : MOOSE 1 — used for one of the Old World **b** : a large gregarious deer (*Cervus elaphus*) of No. America, Europe, Asia, and northwestern Africa — called also *red deer*, *wapiti* **c** : any of various large Asian deer **2** : soft tanned rugged leather **3** *cap* [Benevolent and Protective Order of *Elks*]: a member of a major benevolent and fraternal order

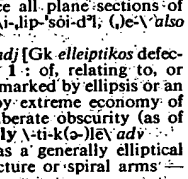
elk·hound \'elk-ˌhau̇nd, 'el-ˌkau̇nd\ *n* (1889) : NORWEGIAN ELKHOUND

'ell \'el\ *n* [ME *eln*, fr. OE; akin to OHG *elina* ell, L *ulna* forearm, Gk *ōlenē* elbow, Skt *aratnī*] (bef. 12c) : a former English unit of length (as for cloth) equal to 45 inches (about 1.14 meters); *also* : any of various units of length used similarly

²ell *n* [alter. of *'el*] (1773) **1** : an extension at right angles to the length of a building **2** : an elbow in a pipe or conduit

el·lag·ic acid \ə-'la-jik-, e-\ *n* [F *ellagique*, fr. *ellag*, anagram of *galle* gall] (1810) : a crystalline phenolic compound $C_{14}H_6O_8$ with two lactone groupings that is obtained esp. from oak galls and some tannins and is used medicinally as a hemostatic

el·lipse \i-'lips, e-\ *n* [Gk *elleipsis*] (ca. 1753) **1 a** : OVAL **b** : a closed plane curve generated by a point moving in such a way that the sums of its distances from two fixed points is a constant : a plane section of a right circular cone that is a closed curve **2** : ELLIPSIS



ellipse 1b: *F, F'* foci; *P, P', P''* any point on the curve; $FP + PF' = FP'' + P''F' = FP' + P'F'$

el·lip·sis \i-'lip-səs, e-\ *n, pl* **el·lip·ses** \-ˌsēz\ [L, fr. Gk *elleipsis* ellipsis, ellipse, fr. *elleipein* to leave out, fall short, fr. *en-* in + *leipein* to leave — more at IN, LOAN] (1540) **1 a** : the omission of one or more words that are obviously understood but that must be supplied to make a construction grammatically complete **b** : a sudden leap from one topic to another **2** : marks or a mark (as . . . or *** or —) indicating an omission (as of words) or a pause

el·lip·soid \i-'lip-ˌsȯid, e-\ *n* (1721) : a surface all plane sections of which are ellipses or circles — **el·lip·soi·dal** \i-ˌlip-'sȯi-dᵊl, (ˌ)e-\ *also* **ellipsoid** *adj*

el·lip·ti·cal \i-'lip-ti-kəl, e-\ *or* **el·lip·tic** \-tik\ *adj* [Gk *elleiptikos* defective, marked by ellipsis, fr. *elleipein*] (1656) **1** : of, relating to, or shaped like an ellipse **2 a** : of, relating to, or marked by ellipsis or an ellipsis **b** (1) : of, relating to, or marked by extreme economy of speech or writing (2) : of or relating to deliberate obscurity (as of literary or conversational style) — **el·lip·ti·cal·ly** \-ti-k(ə-)lē\ *adv*

elliptical galaxy *n* (1948) : a galaxy that has a generally elliptical shape and that has no apparent internal structure or spiral arms — called also *elliptical*; compare SPIRAL GALAXY

el·lip·tic·i·ty \i-ˌlip-'ti-sə-tē, (ˌ)e-\ *n* (1753) : deviation of an ellipse or a spheroid from the form of a circle or a sphere

elm \'elm\ *n* [ME, fr. OE; akin to OHG *elme* elm; L *ulmus*] (bef. 12c) **1** : any of a genus (*Ulmus* of the family Ulmaceae, the elm family) comprising large trees with alternate stipulate leaves and small apetalous flowers **2** : the wood of an elm

elm bark beetle *n* (ca. 1909) : either of two beetles (family Scolytidae) that are vectors for the fungus causing Dutch elm disease: **a** : one (*Hylurgopinus rufipes*) native to eastern No. America **b** : one (*Scolytus multistriatus*) introduced from Europe into eastern No. America

elm leaf beetle *n* (1881) : a small orange-yellow black-striped Old World chrysomelid beetle (*Pyrrhalta luteola*) that in the larval and adult stage is a leaf-eating pest of elms in eastern No. America

El Ni·ño \el-'nē-nyō\ *n, pl* **El Niños** [Sp, lit., the child (i.e., the Christ child); fr. the appearance of the child at the Christmas season] (1925) : an irregularly occurring flow of unusually warm surface water along the western coast of South America that is accompanied by abnormally high rainfall in usu. arid areas and that prevents upwelling of nutrient-rich cold deep water causing a decline in the regional fish population

el·o·cu·tion \ˌe-lə-'kyü-shən\ *n* [ME *elocucioun*, fr. L *elocution-*, *elocutio*, fr. *eloqui*] (15c) **1** : a style of speaking esp. in public **2** : the art of effective public speaking — **el·o·cu·tion·ary** \-shə-ˌner-ē\ *adj* — **el·o·cu·tion·ist** \-sh(ə-)nist\ *n*

elō·dea \ē-'lō-dē-ə\ *n* [NL, genus name, fr. Gk *helōdēs* marshy, fr. *helos* marsh; akin to Skt *saras* pond] (ca. 1868) : any of a small American genus (*Elodea*) of submerged aquatic monocotyledonous herbs

eloign \i-'lȯin\ *vt* [ME *eloynen*, fr. MF *esloigner*, fr. OF, fr. *es-* ex- (fr. L *ex-*) + *loing* (adv.) far, fr. L *longe*, fr. *longus* long] (15c) **1** *archaic* : to take (oneself) far away **2** *archaic* : to remove to a distant or unknown place : CONCEAL

¹elon·gate \i-'lȯŋ-ˌgāt, (ˌ)ē-, 'ē-\ *vb* **-gat·ed; -gat·ing** [LL *elongatus*, pp. of *elongare*, to withdraw, fr. L *e-* + *longus*] *vt* (1578) : to extend the length of ~ *vi* : to grow in length

²elongate *or* **elon·gat·ed** *adj* (1751) **1** : stretched out **2** : SLENDER

elon·ga·tion \(ˌ)ē-ˌlȯŋ-'gā-shən\ *n* (14c) **1** : the angular distance of a celestial body from another around which it revolves or from a particular point in the sky **2 a** : the state of being elongated or lengthened; *also* : the process of growing or increasing in length **b** : something that is elongated

elope \i-'lōp\ *vi* **eloped; elop·ing** [AF *aloper*] (1628) **1** : to slip away : ESCAPE **2 a** : to run away from one's husband with a lover **b** : to run away secretly with the intention of getting married usu. without parental consent — **elope·ment** \-'lōp-mənt\ *n* — **elop·er** *n*

el·o·quence \'e-lə-kwən(t)s\ *n* (14c) **1** : discourse marked by force and persuasiveness; *also* : the art or power of using such discourse **2** : the quality of forceful or persuasive expressiveness

el·o·quent \-kwənt\ *adj* [ME, fr. MF, fr. L *eloquent-*, *eloquens*, fr. prp. of *eloqui* to speak out, fr. *e-* + *loqui* to speak] (14c) **1** : marked by forceful and fluent expression ⟨an ~ preacher⟩ **2** : vividly or movingly expressive or revealing ⟨an ~ monument⟩ — **el·o·quent·ly** *adv*

¹else \'el(t)s\ *adv* [ME *elles*, fr. OE; akin to L *alius* other, *alter* other of two, Gk *allos* other] (bef. 12c) **1 a** : in a different manner or place or at a different time ⟨how ~ could he have acted⟩ ⟨here and nowhere ~⟩ **b** : in an additional manner or place or at an additional time ⟨where ~ is gold found⟩ **2** : if not : OTHERWISE ⟨leave or ~ you'll be sorry⟩ — used absolutely to express a threat ⟨do what I tell you or ~⟩

²else *adj* (bef. 12c) : OTHER **a** : being different in identity ⟨it must have been somebody ~⟩ **b** : being in addition ⟨what ~ did he say⟩

else·where \-ˌ(h)wer, -ˌ(h)war\ *adv* [ME *ellesweher*, fr. OE *elles hwær*] (bef. 12c) : in or to another place ⟨took my business ~⟩

el·u·ant *or* **el·u·ent** \'el-yə-wənt\ *n* [L *eluent-*, *eluens*, prp. of *eluere*] (1941) : a solvent used in eluting

el·u·ate \'el-yə-ˌwāt, -ˌwət\ *n* [L *eluere* + E *-ate*] (1932) : the washings obtained by eluting

elu·ci·date \i-'lü-sə-ˌdāt\ *vb* **-dat·ed; -dat·ing** [LL *elucidatus*, pp. of *elucidare*, fr. L *e-* + *lucidus* lucid] *vt* (ca. 1568) : to make lucid esp. by explanation or analysis ~ *vi* : to give a clarifying explanation *syn* see EXPLAIN — **elu·ci·da·tion** \-ˌlü-sə-'dā-shən\ *n* — **elu·ci·da·tive** \-'lü-sə-ˌdā-tiv\ *adj* — **elu·ci·da·tor** \-ˌdā-tər\ *n*

elu·cu·brate \i-'lü-k(y)ə-ˌbrāt\ *vt* **-brat·ed; -brat·ing** [L *elucubratus*, pp. of *elucubrare* to work on far into the night, fr. *e-* + *lucubrare* to work by lamplight — more at LUCUBRATION] (ca. 1623) : to work out or express by studious effort — **elu·cu·bra·tion** \-ˌlü-k(y)ə-'brā-shən\ *n*

elude \ē-'lüd\ *vt* **elud·ed; elud·ing** [L *eludere*, fr. *e-* + *ludere* to play — more at LUDICROUS] (1667) **1** : to avoid adroitly : EVADE ⟨the mice *eluded* the traps⟩ ⟨managed to ~ capture⟩ **2** : to escape the perception, understanding, or grasp of ⟨subtlety simply ~s them⟩ ⟨victory continued to ~ us⟩ **3** : DEFY 4 ⟨it ~s explanation⟩ *syn* see ESCAPE

Elul \e-'lül\ *n* [Heb *Ēlūl*] (1535) : the 12th month of the civil year or the 6th month of the ecclesiastical year in the Jewish calendar — see MONTH table

elu·sion \ē-'lü-zhən\ *n* [ML *elusion-*, *elusio*, fr. LL, deception, fr. L *eludere*] (1617) : an act of eluding

elu·sive \ē-'lü-siv, -'lü-ziv\ *adj* (1719) : tending to elude: as **a** : tending to evade grasp or pursuit **b** : hard to comprehend or define ⟨an ~ concept⟩ **c** : hard to isolate or identify ⟨a haunting ~ aroma⟩ — **elu·sive·ly** *adv* — **elu·sive·ness** *n*

elute \ē-'lüt\ *vt* **elut·ed; elut·ing** [L *elutus*, pp. of *eluere* to wash out, fr. *e-* + *lavere* to wash — more at LYE] (1731) : EXTRACT; *specif* : to remove (adsorbed material) from an adsorbent by means of a solvent — **elu·tion** \-'lü-shən\ *n*

elu·tri·ate \ē-'lü-trē-ˌāt\ *vt* **-at·ed; -at·ing** [L *elutriatus*, pp. of *elutriare* to put in a vat, perh. fr. *elutrum* vat, fr. Gk *elytron* reservoir, lit., covering] (ca. 1727) : to purify, separate, or remove by washing — **elu·tri·a·tion** \ē-ˌlü-trē-'ā-shən\ *n* — **elu·tri·a·tor** \ē-'lü-trē-ˌā-tər\ *n*

elu·vi·a·tion \(ˌ)ē-ˌlü-vē-'ā-shən\ *n* [*eluvial* of eluviation (fr. *e-* + *-luvial*—as in *alluvial*) + *-ation*] (1899) : the transportation of dissolved or suspended material within the soil by the movement of water when rainfall exceeds evaporation — **elu·vi·al** \ē-'lü-vē-əl\ *adj* — **elu·vi·at·ed** \-'lü-vē-ā-təd\ *adj*